

CHAPTER 4

MEASUREMENT AND CONTROL

4-1. Measurement of process variables. In order to determine the degree of effectiveness of the different treatment processes, several physical and chemical parameters associated with water treatment must be measured. After they are measured, the information must be evaluated so that necessary adjustments can be made in the treatment process.

a. Minimum analyses. The minimum type, number, and frequency of analyses for water treatment plants will conform to paragraph B-1 of appendix B.

b. Laboratories. Provisions should be made for laboratory facilities either on or off the mobilization site. If feasible, the services of private laboratories or laboratories at nearby municipal water plants should be solicited.

c. Records of analyses. Results of laboratory analyses will be recorded and maintained in an orderly filing arrangement.

4-2. Control. Water treatment plant processes may be controlled by manual, semiautomatic, or automatic methods, which are defined as follows.

a. Manual control. Manual control involves total operator control of the various water treatment processes. The personnel at the water treatment plant observe the values of the different variables associated with the treatment processes, and make suitable adjustments to the processes.

b. Semiautomatic control. Semiautomatic control utilizes instruments to automatically control a function or series of functions within control points that are set manually. The operator manually starts the automatic sequence of operations. An example of semiautomatic control is the automatic backwashing of a filter after operator initiation of the program.

c. Automatic control. Automatic control involves the use of instruments to control a process, with necessary changes in the process made automatically by the controlling mechanisms. When a process variable changes, the change is measured and transmitted to a control device which adjusts the mechanisms controlling the process. Automatic control systems have been developed which are reliable, but provisions for emergency manual control must be included.

4-3. Design of instruments and controls. All instruments and control devices should be placed in readily accessible locations in order to

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facilitate observation, maintenance, repair, and replacement. Instruments should not be located in environments which might lead to premature failure of the instruments. Examples of such environments are areas subject to high temperatures or corrosive vapors. Provisions should be made for many of the instruments to actuate alarms if critical process variables exceed or fall below predetermined tolerable levels. Such alarms should include both audio and visual signals.